

Supplement 2: Technology Transfer

Argonne interacts extensively with researchers from industry, academia, and not-for-profit organizations in pursuit of its technology transfer role to provide technical solutions to energy and environmental problems. Such interactions, in most cases conducted under formal R&D agreements, enhance the Laboratory's programs and provide a means of commercializing the technologies and methodologies created by the Laboratory's researchers. The interactions ultimately enhance U.S. economic productivity, international competitiveness, and society as a whole.

A. R&D Agreements

Argonne's Office of Technology Transfer (OTT) is responsible for ensuring effective transfer of technologies. OTT manages the development of R&D agreements, including cooperative R&D agreements (CRADAs) and "work-for-others" (WFO) agreements; negotiates partnerships and licenses of intellectual property developed by the Laboratory; and serves as a point of contact for inquiries concerning Argonne technology. Table S2.1 summarizes Argonne's technology transfer activities for FY 1999-FY 2001 and projects future activities.

The OTT works closely with the Argonne Partnership Committee, composed of Laboratory research managers who meet regularly in working groups that focus on exploring opportunities for technology transfer to industry and identifying R&D programs that could have commercial impact. Working groups coordinate opportunities in eight focus areas based on the Laboratory's research: (1) transportation technology, (2) materials development, (3) process industries technology, (4) carbon management technology, (5) biotechnology, (6) environmental stewardship, (7) urban technology, and (8) national security.

Argonne aggressively pursues joint research programs and other collaborations with its

operating contractor, the University of Chicago, in order to more effectively utilize the skills of both institutions.

B. Licensing

For Argonne inventions thought to have the greatest commercial potential — on the basis of their uniqueness, value, and timeliness — OTT develops market-based technology commercialization strategies with assistance from Laboratory research divisions. The assessment of commercial potential examines such factors as technical value compared with current alternatives, cost of implementation, industry trends, and overall need for the technology. Through cooperative agreements, the Laboratory collaborates with industrial participants to find the shortest and most productive route to technology commercialization.

Table S2.1 reports income from the licensing of Argonne inventions. Royalties received to date stem from two sources: (1) up-front payments for licenses, options, and assignments and (2) current royalties from product sales. Income shares resulting from the licensing of Argonne technology are first disbursed to inventors and authors. Remaining royalties are transferred to the Laboratory divisions from which the licensed technologies originated, to be used (within policies set in accordance with the *Prime Contract*) for the divisions' internally supported R&D and for educational purposes.

Argonne licenses copyrighted software codes and accompanying documentation to commercial and educational organizations for a fee. In addition, selected software is distributed broadly under free licenses to maximize market impact and benefits to industry. The Laboratory also registers trademarks associated with its software and some invention portfolios, in order to distinguish and protect the intellectual property when it is reported in scientific journals, trade publications, or elsewhere.

Table S2.1 Activities Conducted by Argonne's Office of Technology Transfer

	Actual Values			Projected Values		
	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004
Office of Technology Transfer						
Funding (\$ in millions)	2.0	2.0	2.3	2.0	2.1	2.2
Staffing (FTEs)	15	16	16	17	17	17
Active Agreements (including amendments)^a						
Cost-shared (CRADAs)	34	27	27	45	40	45
Reimbursable (WFOs and technical service agreements)	234	230	246	271	298	327
With other DOE contractors	308	300	351	360	389	395
Total	576	557	624	676	727	767
Agreement Funding (funds to the Laboratory, \$ in millions)^a						
Cost-shared (CRADAs)	14.7	15.7	12.1	12.0	13.0	15.0
Reimbursable (WFOs and technical service agreements)	66.7	69.1	70.0	86.4	90.7	95.2
With other DOE contractors	36.8	37.5	35.3	48.0	48.0	48.0
Total	118.2	122.3	117.5	143.4	148.7	155.2
Intellectual Property						
Inventions reported	108	111	106	105	105	105
Software reported	14	8	17	12	12	12
Patent applications filed ^b	44	52	47	40	40	40
Patents issued ^b	51	28	46	40	40	40
Active licenses (all sources) ^c	45	78	121	150	175	195
Royalties (gross, \$ in millions)	1.0	0.7	2.4	2.5	2.0	2.1

^aIncludes agreements with both nonfederal and federal organizations.

^bIncludes (1) patent applications filed by Argonne, ARCH Development Corporation, DOE, and others (e.g., inventors and companies) and (2) patents issuing from those filings.

^cIncludes licenses executed by Argonne, ARCH Development Corporation, and DOE.

Since 1999 the Laboratory has made software available online from its Argonne Software Shop (URL: www.softwareshop.anl.gov). Argonne's home page links directly to the shop. The following four popular software packages are currently available:

- LDAP Browser/Editor, a web-based server directory editor. Licenses have been executed with a number of companies, including DreamWorks, Continuum Networks, Grow Network, and Ellacoya.

- GCTool, a thermodynamic modeling software package with several modules, including one for modeling fuel cells. Purchasers of the software include the University of California and the University of Montreal, as well as a commercial company, Allen Engineering.

- PCx, a linear optimizing module used in programming applications. PCx has been licensed to PaperScience, a small business.

- GTMax, a software package used for energy policy management, analysis of spot energy markets, and planning for new energy and electric facilities to meet predicted future demands. GTMax has been licensed to Adica Consulting, a small business.

Argonne has distributed more than 2,000 copies of software to over 50 commercial and government licensees through its Software Shop.

In conjunction with licensing agreements, Argonne often also executes an R&D agreement aimed at precommercial development, through either a WFO agreement (as discussed in Supplement 1) or a CRADA. In FY 2001 the Laboratory executed 27 CRADAs. Other types of agreements, such as personnel exchanges and technical service agreements, are also used when they meet the needs of the Laboratory and its partners.

Some of Argonne's recently executed CRADAs had the following objectives:

- Mack Trucks: Develop a system for using newly developed air separation membranes to produce nitrogen-enriched air in diesel engine combustion.
- Boeing (CRADA amendment): Develop a high-temperature superconducting flywheel suitable for "energy farms" providing short-term energy storage to serve peak energy demands.
- BP-Amoco Chemicals: Further develop Argonne's catalytic process for converting nitrogen oxides, whereby bifunctional catalysis selectively reduces nitrogen oxides by using hydrocarbons for the reducing agent instead of ammonia.
- METSS Corp.: Develop a recycling technology using sink/float experiments to

separate polycarbonate plastics from shredded CDs and DVDs.

- CH2MHill: Assess potential applications of Argonne's Ceramicrete technology for treating hazardous and nuclear waste by generating solid waste forms that are safe for transport and for radioactive chemical waste disposal sites.
- Fuel Cell Energy: Define a low-cost material for bipolar separator plates and anodes in molten carbonate fuel cells.
- Vertec Biosolvents: Develop and test (1) new membrane materials having high ammonia affinity and (2) fluxes used for cracking and esterification of ammonium lactate with alcohols.

C. Non-WFO Funding from the State of Illinois

For the state of Illinois, Department of Commerce and Community Affairs, Argonne is working on two major non-WFO projects. In the first, the state proposes to fund a new building, the Nanoscience Institute Building, to house the Center for Nanoscale Materials (presented as a major Argonne initiative in Section III.A.1); \$2 million for design work was provided in FY 2002, followed by \$17 million for the first phase of construction in FY 2003. An additional \$17 million is planned for FY 2004. In the second project, the state proposes to fund construction of a building to accompany the Rare Isotope Accelerator (RIA, presented as a major Argonne initiative in Section III.A.2). The state provided \$3.6 million to design the building and has appropriated \$13 million for construction. An additional \$3 million is planned for FY 2004.

